

Restoring the Oil Infrastructure in Iraq

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Iraq's financial future is tied to oil. Iraq's known reserves are estimated to be 115 billion barrels, exceeded only by those of Saudi Arabia and Canada. Yet, little of Iraq has been seismologically explored, and Iraq's real oil reserves may double with adequate exploration.

The weak link to Iraq's future is an outdated, poorly maintained oil infrastructure. In terms of available equipment, Iraqis have been separated from the latest and best technical knowledge since Saddam Hussein gained power in 1980.

Fixing maintenance and technology shortcomings will take capital, technical knowledge and a willing workforce. There is no question that Iraqi oil workers are willing. They are exceptional at making their outdated and marginal system work. However, bringing up Iraq's level of capital and technical know-how is a big undertaking.

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USACE Fort Worth District employee Richard Bingham assesses a pipeline fire near Bayji, Iraq. (U.S. Army photo by Nola Conway.)



when Coalition Forces crossed into Iraq March 22, 2003.

The organization formed by USACE's Task Force Restore Iraqi Oil (TF RIO) was later assigned to the Gulf Regional Division (GRD). This article examines how TF RIO met the mission entrusted to it by DOD and the challenges that the mission encountered along the way.

Oil Fires

Coalition Forces expected as many as 1,000 oil well fires. USACE engineers had pre-positioned equipment and contractors in theater prior to the incursion of Iraq to respond to this major environmental and economic catastrophe. However, because the oil fields were rapidly secured, instead of 1,000 oil well fires, there were only 9. And, instead of months of fighting fires at an anticipated cost of \$7-13 billion, the Corps extinguished fires in less than a month and limited damages to \$400 million. Further, instead of an environmental disaster, TF RIO quickly cleaned up oil spills and centrally stored the spilled oil in holding ponds for follow-on treatment and disposal.

Unexpected Looting

If military planners, including those working for TF RIO, had the right solution to prevent major damage to the oil fields, their planning did not include protecting the infrastructure from looting. Looters severely damaged the oil infrastructure, causing more than \$1 billion in damages. These oil infrastructure damages would require a year for Iraq to return to prewar oil-production levels. Later, TF RIO members learned that Hussein prevented looting and protected the oil field infrastructure with eight Iraqi Divisions before the Gulf War.

Further, the looting of key production facilities such as oil refineries and liquid

petroleum gas (LPG) facilities would lead to an inability to meet Iraq's domestic fuel requirements. TF RIO met this need by operating a multibillion-dollar petroleum import program.

Quick Solution — Rehiring Oil Workers

Rehiring the Iraqi oil workers was key to returning Iraq's prewar production capability. Initially, USACE contractor Kellogg, Brown and Root (KBR) sponsored job fairs at oil facilities to rehire the oil workers.

Former workers showed up at the job fairs wanting to return to work, but questioned if KBR had received approval for them to go back to work with "Mr. Jabbar." At this point, USACE and KBR officials

did not know who Jabbar was. But, after questioning the workers, BG Robert Crear, Southwestern Division Commanding General and TF RIO Commanding General, arranged through intermediaries to meet Jabbar Ali Al-Lueibi in Basrah, a former senior executive of South Oil Co.

Crear's meeting with Jabbar was an important turning point in USACE's mission to restore Iraqi oil production. The leaders agreed to return South Oil Co. employees to their prewar jobs, and Crear appointed Jabbar as Director General of South Oil Co.

This became the template to return 60,000 Iraqi oil workers to their jobs throughout Iraq. There were 14 oil-related Iraqi companies prior to the war, and each survived the war intact.

These workers became the first Iraqis to return to their jobs, and they successfully helped restore the oil infrastructure and production for their country.

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Oil Sanctions Eliminated

A roadblock to domestic production was the U.N.'s sanctions on Iraq's ability to export oil. Removing the sanctions was necessary to produce income to help rebuild Iraq. The U.N. lifted sanctions in May 2003, and the first new oil produced in Iraq was uploaded on the 2-million-barrel super tanker Abqaiq on June 28, 2003, at Mina Al-Bakr export terminal in the Persian Gulf.

Oil exports for the remainder of 2003 reached \$5 billion. Beginning in 2004, oil exports peaked

at a level of 2 million barrels per day, but because of terrorist/insurgent sabotage, have fallen to an average of 1.5 million barrels per day. Even so, the high-priced oil-per-barrel market is adding substantial value to these exports. These funds are an important part of the Iraqi government's ability to continue future infrastructure restoration and development.

Domestic Fuel Crisis Leads to Imports

Damaged oil refineries and LPG plant production facilities precipitated a domestic crisis. To return to normal, Iraqis needed LPG to cook food, boil water and heat homes, and gasoline to fuel vehicles. DOD tasked TF RIO to respond to this urgent problem by importing oil from Kuwait and Turkey.

Stan Reese, one of TF RIO's planners from the USACE's Huntsville, AL, Center, said that this task was completely unexpected. "It's interesting that before the war, we looked at protecting Iraq's export capability and didn't consider that domestic requirements would be a problem in this oil-rich nation. Suddenly, domestic requirements became one of our most important responsibilities," Reese said.

Refining Issues Contribute to Domestic Shortage

In the best of times, it was difficult for Iraqis to refine enough oil for domestic production. Three of Iraq's refineries produce 90 percent of its domestic refined products. Located in Basrah, in southern Iraq; in Doura, near Baghdad; and

in Bayji, 250 kilometers north of Baghdad, these refineries, built by Russians in the 1970s, were poorly maintained and are outdated. The Iraqis damaged the Basrah Refinery during the Iran-Iraq War. The refinery, never fixed, operated at half capacity for 20 years.

In prewar Iraq, the number of cars and trucks were limited, as was the

average person's ability to travel domestically. In postwar Iraq, travel increased and Iraqis imported vehicles in large numbers, causing increased fuel consumption, according to Larry Rogers, TF RIO's senior civilian from August to December 2003. "Regarding Iraq's ability to meet domestic needs, we were getting reports by November 2003 that as many as 200,000 vehicles had entered postwar Iraq. This fact, coupled with a visible increase in consumption rates and fluctuating crude oil supplies because of attacks against pipelines, created a situation where the refining capacity could not meet the domestic need for gasoline," Rogers explained.



Iraqi laborers finish construction on a gas pipeline at the Bayji Power Plant in Bayji, Iraq. USACE engineers, KBR contractors, South Oil Co. employees and Oil Ministry officials have joined forces to restore prewar oil production levels of roughly 2.5 million barrels of oil per day to "fuel" Iraq's sputtering economy.

Once crude oil was produced in the oil fields, there was a high demand for the refineries' products. However, half the crude oil input to the Iraqi's technologically challenged refineries produced a low-grade tar-like residual that did not have an immediate market following the invasion. Storage was needed for the residuals, but Iraq never replaced the storage capacity it lost in the southern oil fields during the Iran-Iraq War.

Inability to dispose of residuals limited the refineries' ability to return to production. Today, in southern Iraq, several power generation plants have been converted from using diesel fuel to using residual fuel, with varying levels of success. In addition, residuals are being injected into the export pipelines in small quantities and being exported by truck.

Oil Production Ties to Reliable Power

Interruptions to refineries' electrical supply were a major problem in post-war Iraq. The refineries used electricity from the national grid before the war. Postwar, the grid is a constant target for looters and saboteurs. Refineries stopped operating every time the grid went down. Once power was lost, even for only a few minutes, it took several days to bring the refinery back to production.

To address this challenge, TF RIO worked to install stand-alone permanent generators at the refineries. Lori Thomas, a USACE Galveston District engineer, worked for TF RIO to provide a generation system for the Basrah refinery. "We installed two generators to provide reliable power to the Basrah

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Refinery, which had been running on power provided from two old, run-down generators the Iraqis had kept going. The new generators belonged to the Iraqis, and had been purchased from the Oil-for-Food program 5 years ago, but never installed," Thomas remarked.

"Electrical power is critical to other oil production processes as well," Thomas continued. "Without power, it's impossible to produce, de-gas and pump oil. Most of the 18-megawatt

(MW) generators were for water injection, which is the future of oil production. Without injecting water into the oil fields, they would be ruined," Thomas stated.

A side benefit to the power grid system was taking the electricity-consuming oil infrastructure off the grid, thereby leaving more power for the rest of Iraq's commercial, industrial and residential sectors.

Water Used to Produce Oil

Water is injected to replace oil taken from the oil reservoirs in the Rumaylah Oil Fields in southern Iraq. Before the war, this water came from Qarmat Ali Water Plant located near Basrah. However, looters and/or saboteurs almost succeeded in destroying this plant as well. By partnering, USACE, KBR and the Iraqi South Oil Co. returned Qarmat Ali Water Plant to better-than-prewar production.

Water is used in the oil production process in several ways. The Qarmat Ali plant treats water from the Basrah River and pipes it to the oil fields to be injected under pressure to a depth of 2 miles underground. The pressure is provided by newly installed injection pumps powered by new 18-MW generators.

This injected water fills the void left when oil is removed from the reservoir and helps to maintain oil reservoir pressure, an important element of maintaining Iraq's oil reservoirs. Unlike the United States, where oil is pumped to the surface by wells, natural geostatic pressure forces oil to the surface



A USACE employee inspects a war-damaged pipeline valve at Ham Dam Junction near Basrah, Iraq. This pipeline is used to export 90 percent of Iraqi oil to the Persian Gulf oil terminal loading facility 9 miles offshore. (U.S. Army photo by Steven E. Wright.)



Iraqi workers place concrete by hand at the Basrah Refinery in southern Iraq. This concrete pad is one of several for generators to power the oil facility. (U.S. Army photo by Alan Dooley.)

through the drilled wells in Iraq. As oil is removed, the pressure drops unless replaced with a fluid — in this case, water.

Water is also used to remove salt from the crude oil in an oil-washing process, a requirement before the oil enters the pipelines. Salt in the oil would cause major corrosion problems for the oil infrastructure unless removed in the field.

Oil Injection in Northern Fields

In the Kirkuk Oil Fields in northern Iraq, crude oil is injected back into the oil reservoir. This is done for two reasons, according to COL Emmett Du Bose, former GRD Director, Oil Directorate. “One purpose of producing crude oil is to obtain the natural gases

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needed to produce LPG. Under normal circumstances, all the crude oil would be exported through the Iraq-to-Turkey (IT) Pipeline, refined at the Doura and Bayji Refineries or used in power production plants,” Du Bose explained. “However, we need to fix pipelines in several areas, including a major river crossing, to allow northern oil to reach normal production levels and eliminate the injection

of excess produced oil that isn’t being used for domestic production by power plants or refineries.”

Sabotage

Oil infrastructure destruction may have been another element of Hussein’s plan to keep Coalition Forces or future Iraqi governments from benefiting from Iraq’s oil. At facilities such as the Qarmat Ali

Water Plant, refineries and LPG plants, it appears that there was purpose to the destruction. Unfortunately, his flawed plan has seriously harmed the Iraqi people and their economy.

Sabotage, expected immediately after the war, continues almost daily against Iraq’s pipelines. Iraq has 4,350 miles of pipeline, most of which is aboveground and extremely vulnerable to attack.

An attack against the oil infrastructure occurred at the Basrah Terminal in the Persian Gulf last spring when three explosive-laden suicide boats attacked the platform. These boats exploded, but there was little damage to the terminal because of Coalition Forces’ actions. Had this attack been successful, Iraq would have lost its ability to export oil as well.

Production Subsidies

Oil production peaked in late February 2004 at 2.5 million barrels per day.

Since then, continued sabotage has caused oil production to slide. Eighty percent of current production is from the southern oil fields.

The pipeline delivery system is the primary obstacle to the Kirkuk Oil Field reaching its potential production level. Pipeline projects at the Al-Fathah Tigris River Crossing and a 50-kilometer pipeline project from Al-Fathah to Kirkuk have not been completed but will be needed before the IT pipeline is filled with oil produced in the northern fields. Without the ability to export, there is little reason to increase oil production in the north.

The IT pipeline terminus at the Turkish port of Ceyhan provides the ability to export northern oil from the Mediterranean. In the south, the Al Faw Peninsula pipeline transports crude oil from the Rumaylah Oil

Fields past Basrah and down to the tip of the peninsula. It is then transported under the Persian Gulf 9 miles to the Basrah Terminal, where super-tankers are uploaded for destinations worldwide. Almost all of Iraq's oil now enters the export market from the Basrah Terminal.

USACE Civilian Volunteers

The Corps' civilian volunteers have put themselves in harm's way to accomplish the oil-restoration mission. In doing so, they proved to their military colleagues that they meet many Soldier's Creed elements. They were team members, serving the United States and living Army values. They placed their mission first, did not accept defeat, never quit, were expert and professional and stood ready to deploy alongside their uniformed counterparts.

Never in the Corps' 229-year history have USACE civilians been asked to

stand as tall and risk as much in a theater of operations. They do this willingly, shoulder-to-shoulder with their Soldier colleagues. They wear the Army uniform and willingly shoulder their load to accomplish a mission that is essential to American foreign policy and rebuilding the Iraqi infrastructure. In doing so, they have found a greater respect for Soldiers. And, Soldiers have found greater respect for what Army civilians can and will do.

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Iraqi contract workers collect pooled crude oil spilled from a war-damaged pipeline near Basrah. Environmental protection was a TF RIO mission requirement. After cleaning up the oil spills, the contractor transported the crude to holding ponds. (U.S. Army photo by Jonas Jordan.)